UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/795,952	03/08/2004	Takashi Komura	TOW-066RCE2	1413

959 7590 02/09/2009

LAHIVE & COCKFIELD, LLP
FLOOR 30, SUITE 3000
ONE POST OFFICE SQUARE
BOSTON, MA 02109

EXAMINER	
CHUO, TONY SHENG HSIANG	
ART UNIT	**PAPER NUMBER**
1795	

MAIL DATE	DELIVERY MODE
02/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/795,952	KOMURA ET AL.	
	Examiner	Art Unit	
	Tony Chuo	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-13* is/are pending in the application.

4a) Of the above claim(s) *10 and 11* is/are withdrawn from consideration.

5)☒ Claim(s) *1-4,6,12 and 13* is/are allowed.

6)☒ Claim(s) *7-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment/Arguments

1. Claims 1-4 and 6-13 are currently pending. Claims 5 and 14 are cancelled. Claims 10 and 11 are withdrawn from further consideration as being drawn to a non-elected invention. Claims 1-4, 6, 12, and 13 have been previously allowed. The applicant argues that the newly cited Nanaumi reference does not qualify as a prior reference because it is disqualified under 35 USC 103(c). However, the 103(c) statement is insufficient to disqualify the Nanaumi reference because it is missing the statement of common ownership which states that the subject matter of the prior art reference and the claimed invention, at the time of the invention, were owned by the same person or subject to an obligation of assignment to the same person. Therefore, the Nanaumi reference still qualifies as a prior art reference under 35 USC 102(e) so claims 7-9 stand rejected under the previously stated 103 rejections. In addition, Nanaumi et al (EP 1289042 A2) qualifies as a prior art reference under 35 USC 102(a) because it was published on March 5, 2003 which is before the earliest priority date, March 7, 2003, of the present application. Therefore, claims 7-9 are also rejected under the following new 103 rejections.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Nanaumi et al (US 2003/0049518).

The Narayanan reference discloses a plurality of membrane electrode assemblies “97”,”98”,”99”, each comprising: an anode “104” and a cathode “103” wherein each anode and cathode includes a gas diffusion backing layer and a catalyst layer stacked together; wherein the first end of the first gas diffusion layer of cathode “103” of MEA “97” protrudes toward MEA “98” and the second end of the second gas diffusion layer of anode “104” of MEA “98” protrudes toward MEA “97”; and wherein the first end and the second end are electrically connected with each other by an interconnect “135” extending through at least the electrolyte (See column 2, lines 12-15, column 2 lines 65 to column 3 line 5, and Figure 1B).

However, Narayanan et al does not expressly teach a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of

the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer.

The Nanaumi reference teaches the concept of bonding the first end of the gas diffusion layer “34” that extends beyond the first end of the first catalyst layer “30” to an electrolyte membrane “22” by using a bonding layer “36” (reinforcing film) that is in physical contact with and interposed between the electrolyte membrane “22” and first end of the first electrically conductive gas diffusion layer “34” of the first electrode wherein the bonding layer is separate from the first catalyst layer “30”, and wherein the bonding layer is a silicon agent (See Figure 1 and paragraph [0048],[0051]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan fuel cell to include a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer in order to improve the seal of the reactant gases and to protect the electrolyte membrane from the stress from the end surfaces of the catalyst layers.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Nanaumi et al (US 2003/0049518) as applied to claim 7 above, and further in view of Batfalsky et al (US 2003/0113609). In addition, the Narayanan reference also discloses first electrically conductive gas diffusion layer of the first electrode of the first power generation unit "97" and the second electrically conductive gas diffusion layer of the second electrode of the second power generation unit "98" that have overlapping portions with the electrolyte interposed between the overlapping portions and are electrically connected together by the interconnect "135" (See Figure 1B).

However, Narayanan et al as modified by Nanaumi et al does not expressly teach an electrically conductive member that is an electrically conductive rivet member. The Batfalsky reference discloses contact elements "3" that are electrically conductive rivet members (See paragraph [0021] and Figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Nanaumi fuel cell to include an electrically conductive member that is an electrically conductive rivet member in order to utilize contact elements that are suitable for current conducting and are easily deformable.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Nanaumi et al (US 2003/0049518) as applied to claim 7 above, and further in view of Jansing et al (US 5942348). In addition, the Narayanan reference also discloses an electrolyte "115" that is an electrolyte

membrane; and power generation units “97”,”98”,”99” that are arranged in the same plane to form an MEA unit (See column 2, lines 6-7 and Figure 1B).

However, Narayanan et al as modified by Nanaumi et al does not expressly teach a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator. The Jansing reference discloses a first electrically insulating bipolar plate “30” and a second electrically insulating bipolar plate “30’” that sandwich the MEA “43”; oxygen gas grooves “31” facing the MEA “43” that is provided on the first electrically insulating bipolar plate; and hydrogen gas grooves “31’” facing the MEA “43” that is provided on the second electrically insulating bipolar plate (See column 8, lines 8-16 and Figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Nanaumi fuel cell to include a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator in order to prevent an electrical short circuit between the power generation units and to be able to supply reaction gases to the membrane electrode assemblies.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Nanaumi et al (EP 1289042).

The Narayanan reference discloses a plurality of membrane electrode assemblies “97”,”98”,”99”, each comprising: an anode “104” and a cathode “103” wherein each anode and cathode includes a gas diffusion backing layer and a catalyst layer stacked together; wherein the first end of the first gas diffusion layer of cathode “103” of MEA “97” protrudes toward MEA “98” and the second end of the second gas diffusion layer of anode “104” of MEA “98” protrudes toward MEA “97”; and wherein the first end and the second end are electrically connected with each other by an interconnect “135” extending through at least the electrolyte (See column 2, lines 12-15, column 2 lines 65 to column 3 line 5, and Figure 1B).

However, Narayanan et al does not expressly teach a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer.

The Nanaumi reference teaches the concept of bonding the first end of the gas diffusion layer “34” that extends beyond the first end of the first catalyst layer “30” to an electrolyte membrane “22” by using a bonding layer “36” (reinforcing film) that is in

physical contact with and interposed between the electrolyte membrane “22” and first end of the first electrically conductive gas diffusion layer “34” of the first electrode wherein the bonding layer is separate from the first catalyst layer “30”, and wherein the bonding layer is a silicon agent (See Figure 1 and paragraph [0026],[0029]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan fuel cell to include a first end of the first electrically conductive gas diffusion layer that extends beyond a first end of the first catalyst layer; a second end of the second electrically conductive gas diffusion layer that extends beyond a second end of the second catalyst layer; a first reinforcing film that is in physical contact with and interposed between the electrolyte and the first end of the first electrically conductive gas diffusion layer of the first electrode wherein the reinforcing film is separate from the first catalyst layer; and a second reinforcing film that is in physical contact with and interposed between the electrolyte and the second end of the second electrically conductive gas diffusion layer of the second electrode wherein the second reinforcing film is separate from the second catalyst layer in order to improve the seal of the reactant gases and to protect the electrolyte membrane from the stress from the end surfaces of the catalyst layers.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Nanaumi et al (EP 1289042) as applied to claim 7 above, and further in view of Batfalsky et al (US 2003/0113609). In addition, the Narayanan reference also discloses first electrically conductive gas diffusion layer of the first electrode of the first power generation unit “97” and the second electrically

conductive gas diffusion layer of the second electrode of the second power generation unit “98” that have overlapping portions with the electrolyte interposed between the overlapping portions and are electrically connected together by the interconnect “135” (See Figure 1B).

However, Narayanan et al as modified by Nanaumi et al does not expressly teach an electrically conductive member that is an electrically conductive rivet member. The Batfalsky reference discloses contact elements “3” that are electrically conductive rivet members (See paragraph [0021] and Figure 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Nanaumi fuel cell to include an electrically conductive member that is an electrically conductive rivet member in order to utilize contact elements that are suitable for current conducting and are easily deformable.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narayanan et al (US 6680139) in view of Nanaumi et al (EP 1289042) as applied to claim 7 above, and further in view of Jansing et al (US 5942348). In addition, the Narayanan reference also discloses an electrolyte “115” that is an electrolyte membrane; and power generation units “97”,”98”,”99” that are arranged in the same plane to form an MEA unit (See column 2, lines 6-7 and Figure 1B).

However, Narayanan et al as modified by Nanaumi et al does not expressly teach a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first

electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator. The Jansing reference discloses a first electrically insulating bipolar plate “30” and a second electrically insulating bipolar plate “30’” that sandwich the MEA “43”; oxygen gas grooves “31” facing the MEA “43” that is provided on the first electrically insulating bipolar plate; and hydrogen gas grooves “31’” facing the MEA “43” that is provided on the second electrically insulating bipolar plate (See column 8, lines 8-16 and Figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Narayanan/Nanaumi fuel cell to include a first and second electrically insulating separators for sandwiching the MEA unit; a fuel gas flow field facing the power generation units that is provided on the first electrically insulating separator; and an oxygen containing gas flow field facing the power generation units that is provided on the second electrically insulating separator in order to prevent an electrical short circuit between the power generation units and to be able to supply reaction gases to the membrane electrode assemblies.

Allowable Subject Matter

9. Claims 1-4, 6, 12, and 13 are allowed.

The Badding reference discloses fuel cell “200” comprising: an array of fuel cells wherein each electrochemical cell includes an anode “16”, a cathode “12”, and an electrolyte sheet “10” in between the anode and cathode; an interconnect “14” that is an electrical conductor that is disposed between a pair of adjacent fuel cells and is not

stacked on either of the adjacent fuel cells wherein the interconnect is electrically connected to the cathode of one of the adjacent fuel cell and extending in parallel to the cathode and is also electrically connected to the anode of the other of the adjacent fuel cell and extending in parallel to the anode, and wherein a portion of the electrolyte of the pair of adjacent fuel cells is sandwiched between the interconnect (See paragraph [0030] and Figure 1B). However, Badding et al does not expressly teach a film having windows that is laminated on the porous insulating film such that at least one of the first and second electrodes of the power generation units are disposed in the windows.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795